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(54) Mechanism for connecting IC card and external device.

(57) A connection mechanism for connecting an IC card and an external device to each other has, a plurality of electrode terminals 6 formed on a package 5 of the IC card in which a semiconductor device is incorporated, to connect the semiconductor device to the external device; a pair of engagement recesses formed on the package of the IC card; and a connector provided in the external device, having a card receiving portion 3 into which the IC card is inserted, a plurality of electrode contacts 7 inside the card receiving portion for contacting the electrode terminals of the IC card when the IC card is inserted into the card receiving portion to a predetermined position. A pair of resilient retaining members 43 are disposed in the card receiving portion and are capable of advancing towards or retreating from engagement recesses 21 of the IC card and elastically engaging with the engagement recess so as to retain the IC card at the predetermined position when the IC card is inserted to the predetermined position. The retaining members may also act as switch contacts, to control the external device.

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Description

MECHANISM FOR CONNECTING IC CARD AND EXTERNAL DEVICE

BACKGROUND OF THE INVENTION

This invention relates to a mechanism for connecting an IC card, such as a game-program card, to an external device, such as a card reader for reading information recorded in the IC card.

Fig. 1 is a schematic perspective view of a conventional IC card 4, and Fig. 2 is a plan view showing the internal structure of a connector 1 provided in an external device (e.g., card reader), in which an upper portion of the connector is omitted. A card entrance 2 and a card receiving portion 3 are formed in the connector 1, and a multiplicity of elastic electrode-contacting pieces 7 are disposed on an inner portion of the card receiving portion 3. The IC card 4 incorporates a semiconductor device (not shown) which is encapsulated in a package 5. A multiplicity of electrode terminals 6 which are external terminals of the semiconductor device are disposed on an obverse-side surface of a front portion of the package 5 in relation to the direction in which the IC card 4 is inserted into the connector 1. Fig. 3 shows a state in which the conventional IC card 4 is inserted into the connector 1.

The IC card 4 is used by being inserted into the card receiving portion 3 of the connector 1 through the card entrance 2. When the IC card 4 is completely inserted into the connector 1, the electrode terminals 6 disposed on the surface of the IC card 4 contact with the electrode-contacting pieces 7 disposed in the connector 1, thereby establishing electrical connection between the semiconductor device in the IC card 4 and the external device.

To disconnect the semiconductor device in the IC card 4 and the external device from each other, the IC card 4 is pulled out from the card receiving portion 3 of the connector 1.

The thus-constructed mechanism adapted to connect the conventional IC card and the external device to each other does not function to sufficiently retain the IC card 4 by the card receiving portion 3 of the connector 1, and there is, therefore, a possibility of the contacts of the electrode terminals 6 and the electrode-contacting pieces 7 becoming misaligned while in contact with each other, or a possibility of the IC card 4 coming out of the connector after the card 4 has been inserted therein. In addition, the depth to which the IC card 4 is inserted into the connector 1 can not be perceived by the operator, and there is a possibility of the front end of the IC card 4 being broken by roughly impacting against the surface of the innermost wall of the connector 1 if the card is carelessly inserted into the connector.

In the conventional connection mechanism, a card which is different from the specific IC card 4 can be inserted if it has the same outside dimensions of the package 5. Therefore, it cannot be confirmed whether or not a card is acceptable until the external device is actually started after the IC card 4 has been inserted into the card receiving portion 3 of the connector 1.

SUMMARY OF THE INVENTION

The present invention has been achieved in consideration of these circumstances, and an object of the present invention is to provide a mechanism which is adapted to connect an IC card and an external device to each other and which is capable of preventing detachment of the IC card, misalignment of the electrode terminals of the IC card with the electrode-contacting pieces of a connector provided in the external device, and damage to the IC card when the IC card is inserted into the connector.

Another object of the present invention is provide a mechanism between an IC card and an external device which is capable of detecting the conformity of the IC card to a connector provided in the external device when the IC card is inserted in the connector, the external device being capable of starting an operation thereof when the IC card is determined to be one of the cards acceptable for use according to the result of above conformity detection.

The present invention provides in one of its aspects a connection mechanism constituted by engagement recesses formed in side surfaces of the IC card and retaining means disposed in two minor inner walls of a connector provided in an external device, the retaining means being capable of engaging with and disengaging from the engagement recesses by advancing toward or retreating from the engagement recesses when the card is inserted into the connector.

The present invention provides in another of its aspects a connection mechanism constituted by engagement recesses formed in side surfaces of the IC card and contact means for determining whether the IC card is an acceptable card or not, and the contact means disposed in two minor inner walls of a connector provided in an external device face and engage the engagement recesses when the predetermined IC card which is acceptable for use with the external device is inserted into the connector. That is, the IC cards which are acceptable for use in the external device have the engagement recess in the side surfaces thereof in the portion facing and engaging with the contact means of the connector. This contact means may have the above function of positively retaining the IC card in the connector at a desired position by engaging with the engagement recesses of the IC card.

In accordance with the present invention, the IC card can be positively retained at a predetermined position in the connector, and the engagement between the engagement recesses of the IC card and the retaining means of the connector can be perceived as a distineture click.

In accordance with the present invention, the contact means which are provided in the connector and adapted for determining whether the IC card inserted in the connector is one of the cards acceptable for use or not, are in the open state or

closed state when the IC card is inserted into the connector of the external device, thereby starting or preventing the operation of driving the external device in response to the state of the contact means.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a conventional IC card;

Fig. 2 is a plan view of a conventional connector in which an upper portion of the connector is omitted;

Fig. 3 is a plan view of the conventional IC card and connector in which the upper portion of the connector is omitted, illustrating a state in which the IC card is inserted into the connector;

Fig. 4 is a plan view of a connector in accordance with a connection mechanism which is adapted to connect an IC card and an external device to each other and which represents a first embodiment of the present invention, an upper portion of the connector being omitted;

Fig. 5 is a perspective view of an IC card in accordance with the first embodiment;

Fig. 6 is a plan view of the IC card shown in Fig. 5 and of the connector shown in Fig. 5, illustrating a state in which the former is inserted into the latter, the upper portion of the connector being omitted;

Fig. 7 is a plan view of another example of the connector in accordance with the first embodiment in which an upper portion of the connector is omitted;

Fig. 8 is a plan view of the IC card shown in Fig. 5 and of the connector shown in Fig. 7, illustrating a state in which the former is inserted into the latter, the upper portion of the connector being omitted;

Fig. 9 is a plan view of a connector in accordance with a second embodiment of the present invention in which an upper portion of the connector is omitted;

Fig. 10 is a perspective view of an IC card in accordance with the second embodiment;

Fig. 11 is a plan view of the IC card shown in Fig. 10 and of the connector shown in Fig. 9, illustrating a state in which the former is inserted into the latter, the upper portion of the connector being omitted;

Fig. 12 is a plan view of the connector shown in Fig. 9, illustrating a state in which a different type of card is inserted into the connector, the upper portion of the connector being omitted;

Fig. 13 is a plan view of another example of the connector in accordance with the second embodiment in which an upper portion of the connector is omitted;

Fig. 14 is a plan view of the IC card shown in Fig. 10 and of the connector shown in Fig. 13, illustrating a state in which the former is inserted into the latter, the upper portion of the connector being omitted; and

Fig. 15 is a plan view of the connector shown in Fig. 13, illustrating a state in which a different type of card is inserted into the connector, the upper portion of the connector being omitted.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Figs. 4 and 5 show a connector and an IC card provided with a mechanism which is adapted to connect the IC card and an external device and which represents an embodiment of the present invention. Fig. 4 is a plan view of the connector in which an upper frame member is omitted, and Fig. 5 is a perspective view of the IC card. Fig 6 shows a state in which the IC card shown in Fig. 5 is inserted into the connector shown in Fig. 4. In these figures, components which are identical or correspond to those of the conventional arrangement shown in Figs. 1 to 3 are indicated by the same reference characters, and they will not be described in detail again. As shown in Fig.; 5, a pair of engagement recesses 21 is formed in side surfaces of the package 5 of the IC card 4. This pair of engagement recesses 21 is formed when the package 5 is formed. As shown in Fig. 4, a pair of groups of members which constitute the retaining means 22 are disposed in both side walls of the connector 1. Each group of members of the retaining means is constituted by a recess 22a formed in one of two side walls of the card receiving portion 3 of the connector 1, and an elastic piece 22b having a bent portion 22c projecting inside the card receiving portion 3. The elastic piece 22b is formed in such a manner that it can be elastically bent toward the recess 22a and can be engaged with the engagement recess 21 of the card 4 when the card 4 is inserted into the card receiving portion 3 to a predetermined position. Generally, this position is determined so as to optimize the state of contact between the plurality of electrode terminals 6 of the IC card 4 and the plurality of electrode-contacting pieces 7 of the connector 1. The bent portions 22c of the pair of elastic pieces 22b are formed in such a manner that they enable the card 4 to be smoothly inserted.

The thus-constructed connection mechanism operates as described below. When, the IC card 4 is inserted into the card receiving portion 3 of the connector 1 through the card entrance 2, the elastic pieces 22b are moved into the recesses 22a by the side surfaces of the IC card. Thereafter, as shown in Fig. 6, the elastic pieces 22b engage with the engagement recesses 21 of the IC card 4 when the card 4 is inserted into the connector 1 and the electrode terminals 6 of the card 4 reach the position at which they are brought into contact with the electrode-contacting pieces 7 of the connector 1. Thus, the IC card 4 can be positively retained at the predetermined position in the card receiving portion 3, thereby preventing the electrode terminals 6 and the electrode-contacting pieces 7 from being misaligned. In addition, the engagement between the engagement recesses 21 of the card 4 and the elastic pieces 22b of the connector 1 can be received as a click sound. It is thereby possible to prevent the IC card 4 from colliding against the connector 1 and, hence, the possibility of the IC

card 4 or the connector 1 from being broken when the IC card is inserted into the connector.

The IC card 4 is pulled out from the card receiving portion 3 of the connector 1 against the elastic force of the elastic pieces 22b.

The retaining means provided in the connector 1 are not limited to the type in accordance with the above-described embodiment, and other types of retaining means, including one shown in Figs. 7 and 8, can be used instead. Referring to Figs. 7 and 8, each retaining means 31 is constituted by: a recess 33 which is formed in a side wall of the card receiving portion 3 of the connector 1 and which has stop portions 33a provided on opposite sides of the recess; and a retaining pin 31c which is capable of projecting from or retreating into the recess 33 while being urged by a spring 32, and which has a semispheric engagement head 31a and a collar 31b for preventing it from coming out of the recess. As shown in Fig. 8, the engagement heads 31a of the retaining pins 31c engage with the engagement recesses 21 of the card 4 respectively when the card 4 is inserted into the connector 1 and the electrode terminals 6 of the card 4 reach the position at which they are brought into contact with the electrode-contacting pieces 7 of the connector 1.

The engagement recesses 21 formed on the IC card and the retaining means 22 or 31 formed on the connector are not limited to those according to the above-described embodiments, and the position, shape, outside dimensions and number of these portions can be selected as desired.

Figs. 9 and 10 show a connector and an IC card provided with a connection mechanism which is adapted to connect the IC card to an external device and which represents another embodiment of the present invention. Fig. 9 is a plan view of the connector in which an upper frame portion is omitted, and Fig. 10 is a perspective view of the IC card. In this figures, components which are identical or correspond to those of the conventional arrangement shown in Figs. 1 to 3 are indicated by the same reference characters, and they will not be described in detail again. As shown in Fig. 10, a pair of engagement recesses 21 are formed in side surfaces of the package 5 of the IC card 4. This pair of engagement recesses 21 are formed when the package 5 is formed. As shown in Fig. 9, a pair of groups of members which constitute a contact means 40 are disposed in both side walls of the connector 1. Each group of members of the contact means 40 is constituted by a recess 41 formed in one of two side walls of the card receiving portion 3 of the connector 1, and first and second contact elements 41 and 43. The first contact element 42 is a hook-like member made of an electroconductive material and having a contact point 42a formed at its one end. The other end of the hook-like member is fixed to a wall portion of the recess 41 and is electrically connected to, for example, a control section (not shown) of the external device. The second contact element 43 is made of an electroconductive material and has a contact point 43a formed at its one end, and a bent portion 43b formed at its intermediate portion. The other end of the second contact element 43 is fixed to a wall portion of the recess 41 and is electrically connected to the control section of the external device. The bent portion 43b of the second contact element 43 projects inside the card receiving portion 3. The contact means 40 is formed in such a manner that, when the card 4 is inserted into the card receiving portion 3 to a predetermined position, the bent portion 43b of the contact element 43 enters the engagement recess 21 formed in the card 4 and the contact point 43a of the second contact element 43 contacts the contact point 42a of the first contact element 42. When the card reaches this predetermined position, the contact between the plurality of electrode terminals 6 of the IC card 4 and the electrode-contacting pieces 7 of the connector 1 becomes optimized. As to the first and second contact elements, at least the second contact element 43 is entirely formed from a material which is electroconductive and which can be elastically deformed.

In this connection mechanism, when the IC card 4 is inserted into the card receiving portion 3 of the connector 1 through the card entrance 2, and when the electrode terminals 6 of the card 4 reach the positive at which they are brought into contact with the electrode-contacting pieces 7 of the connector 1, as shown in Fig. 11, the bent portions 43b of the second contact elements 43 enter the engagement recesses 21 formed in the card 4 so that the contact points 43a of the second contact elements 43 are brought into contact with the contact points 42a of the first contact elements 42.

If as shown in Fig. 12, an IC card 4a which is not the IC card 4 or which is of a type different from that of the IC card 4 is inserted into the connector 1, the second contact elements 43 are depressed by the IC card 4a and are thereby moved toward the recesses 41 so that the contact points 43a of the second contact elements 43 are disconnected from the contact points 42a of the first contact element 42.

If, in this case, the contact means 40 is used to control the operation of starting or not-starting the external device (card reader), when a card different from the IC card 4 is inserted, the operation of the card reader can not be started since the contact means 40 are thereby opened. It is therefore possible to discriminate at the time of insertion whether or not the card inserted is of the authorized type.

The contact means 40 provided in the connector 1 is not limited to that in accordance with the above embodiment, and a means such as that shown in Fig. 13 can be used instead. In each contact means 50 shown in Fig. 13, recess 51 which has stop portions 51a provided on opposite sides of the recess is formed in a side wall of the card receiving portion 3 of the connector 1. A contact pin 53 which is capable of projecting from or retreating into the recesses 51 while being urged by spring 52 which is electrically connected to, for example, a control section (not shown) of the external device is disposed in the recess 51. Each contact pin 53 has a semispheric engagement head 53a and a collar 53b which is normally in contact with a contact point 54a

of a contact element 54 and which also functions to prevent the contact pin from coming out of the recesses. One end of the contact element 54 is connected to the control section of the external device. These members are made of electroconductive materials.

If, as shown in Fig. 14, the authorized IC card 4 is inserted into the connector 1, the electrode terminals 6 of the card 4 reach the position at which they contact the electrode-contacting pieces 7 of the connector 1. At this point, the engagement heads 53a of the contact pins 53 enter the engagement recesses 21 of the card 4 so that contact points of the collars 53b of the contact pins 53 and contact points 54a of the contact element 54 are brought into contact with each other.

If as shown in Fig. 15, an IC card 4a which is not the IC card 4 or which is of a type different from that of the IC card 4 is inserted into the connector 1, the contact pins 53 are depressed by the IC card 4a and are thereby moved toward the recesses 51 so that the contact points of the 53b of the contact pins 53 are disconnected from the contact points 54a of the contact element 54.

In this embodiment, the operation of the external device can not be started when the contact means 50 are in the open position, but it is possible to otherwise construct the contact means 50 in such a manner that the external device can not be started when the contact means 50 are in the open state.

The contact means 50 may, of course, have the function of retaining the IC card 4 in the card receiving portion 3 at a predetermined position by engaging with the engagement recesses 21 formed on the IC card 4 in a manner similar to that in the case of the above-described retaining means 22 or 32.

The engagement recesses formed in the IC card and the contact means formed on the connector in accordance with this embodiment are not limited to those described above, and the position, shape, outside dimensions and number of these means can also be selected as desired.

In the described embodiments of the invention, the IC card package is provided with at least one engagement recess, and the device connector is provided with at least one retaining detent.

It is within the scope of the invention, to provide a retaining detent or detents on the IC card package, to engage corresponding abutments provided in the connector. In a further possible arrangement, mutually inter-engaging respective resilient detents are provided both on the IC card package and in the connector.

Claims

1. A connection mechanism for connecting an IC card and an external device to each other, comprising:

a plurality of electrode terminals (6) formed on a package (5) of said IC card in which the semiconductor device is incorporated, said electrode terminals being adapted to contact said semiconductor device to said external device; and

a connector (1) provided in said external device, said connector having a card receiving portion (3) into which said IC card is inserted, a plurality of electrode-contacting elements (7) disposed inside said card receiving portion and capable of contacting said plurality of electrode terminals of said IC card when said IC card is inserted into said card receiving portion to a predetermined position,

characterized in that the card receiving portion (3) and the IC card package (5) are respectively provided with complementary mutually inter-engageable detent means (21, 22), such that the IC card is releasably retained at its predetermined position in the card receiving portion.

2. A connection mechanism as claimed in claim 1, in which the said detent means comprise at least one engagement recess (21) formed on the package (5) of the IC card, and at least one retaining means disposed on said card receiving portion and capable of advancing toward or retreating from said engagement recess of said IC card and elastically engaging with said engagement recess so as to retain said IC card at said predetermined position when said IC card is inserted to the predetermined position.

3. A connection mechanism according to claim 1 or 2, wherein, when said IC card is retained at said predetermined position, the contact between said plurality of electrode terminals and said plurality of electrode-contacting pieces of said connector is optimized.

4. A connection mechanism according to claim 2, or 3 wherein said mechanism includes a pair of engagement recesses (21) formed in side surfaces of said IC card, and a pair of retaining means (22) disposed on two side walls of said card receiving portion, said retaining means facing said engagement recesses respectively when said IC card is inserted to said predetermined position.

5. A connection mechanism according to claim 2, 3 or 4, wherein said retaining means include engagement means (31) capable of engaging with said engagement recesses (21) of said IC card, and the accommodation means (33) which accommodate said engagement means in said side walls of said card receiving portion, said engagement means being capable of projecting from or retreating into said accommodation means.

6. A connection mechanism according to claim 2, 3 or 4, wherein each of said retaining means include a recess (22a) formed in one of said side walls of said card receiving portion, and an eleastic piece (22b) having a portion which projects from said recess of said card receiving portion and which is capable of engaging with one of said engagement re-

cesses of said IC card, one end of each elastic piece being fixed to a portion of a corresponding one of said recesses of said card receiving portion, said elastic piece being capable of elastically projecting from or retreating into said recess of said receiving portion.

7. A connection mechanism according to claim 6, wherein each of said elastic pieces has a bent portion which is formed at its intermediate portion and which can be smoothly brought into engagement with a corresponding one of said engagement recesses of said IC card while projecting from said recess of said card receiving portion.

8. A connection mechanism according to claim 2, 3 or 4, wherein each of said retaining means include:

a recess (33) formed in one of said side walls of said card receiving portion and having stop portions (33a) formed at opposite sides of its opening;

a retaining pin (31c) having an engagement head (31a) capable of engaging with one of said engagement recesses of said IC card, and a collar (3b) for preventing said retaining pin from coming out of said recess of said card receiving portion by engaging with said stop portions formed at said opening of said recess; and

a spring (32) disposed inside said recess of said card receiving portion and adapted to provide forces constantly urging said retaining pin outwardly of said recess of said card receiving portion.

9. A connection mechanism according to claim 8, wherein said engagement head (31a) of said retaining pin has a semispheric-shape whereby said engagement pin can be smoothly brought into engagement with said engagement recess (21) of said IC card.

10. A connection mechanism for connecting an IC card and an external device to each other, comprising:

a plurality of electrode terminals (6) formed on a package (5) of said IC card in which a semiconductor device is incorporated, said electrode terminals being adapted to connect said semiconductor device to said external device; and

a connector (1) provided in said external device, said connector having a card receiving portion (3) into which said IC card is inserted, a plurality of electrode-contacting elements (7) disposed inside said card receiving portion and capable of contacting said plurality of electrode terminals of said IC card when said IC card is inserted into said card receiving portion to a predetermined position,

characterized in that at least one engagement recess is formed on the IC card package (5), and the card receiving portion (3) is provided with at least one contact means (40) adapted to control the operation of starting or preventing the starting of said external device, said contact means capable of opening or closing in response to the engagement with or disengagement of the contact means from said engagement recess (21) of said IC card when said IC card is inserted to said predetermined position.

11. A connection mechanism according to claim 10, wherein , when said IC card is retained at said predetermined position, the contact between said plurality of electrode terminals and said plurality of electrode-contacting pieces of said connector is optimized.

12. A connection mechanism according to claim 11 or 12, wherein said contact means (40) has a function of retaining said IC card in said card receiving portion at said predetermined position by engaging with said engagement recess (21) of said IC card.

13. A connection mechanism according to claim 11 or 12, wherein said mechanism includes a pair of engagement recesses (21) formed in side surfaces of said IC card, and a pair of contact means (40) disposed on two side walls of said card receiving portion, said retaining means facing said engagement recesses respectively when said IC card is inserted to said predetermined position.

14. A connection mechanism according to any of claims 10 to 13, wherein said contact means include first contact means (43) capable of engaging with one of said engagement recesses, second contact means (42) adapted for contact with said first contact means, and accommodation means for accommodating said first and second contact means in said side wall of said card receiving portion, said first contact means contacting or separating from said second contacting means in response to its operation of engaging with or disengaging from one of said engagement recesses of said IC card.

15. A connection mechanism according to any of claims 10 to 13, wherein each of said contact means includes:

a recess (41) formed in said side wall of said card receiving portion;

a first contact element (42) in the form of a hook made of an electroconductive material and having at its one end a contact point (42a), the other end of the first contact element being fixed inside said recess of said card receiving portion and electrically connected to a control section of said external device; and

a second contact element (43) made of an elastic electroconductive material and having portions (43b) projecting from said recess of said card receiving portion and capable of engaging with said engagement recess (21) of said IC card, one end of said second contact element being fixed inside of said recess of said card receiving portion and electrically connected to said control section, the other end of the second contact element being provided with a contact point (43a) capable of contacting or separating from said contact point of said first contact element in response to the engagement or disengagement between said

second contact element and a corresponding one of said engagement recesses (21) of said IC card.

16.A connection mechanism according to claim 15, wherein each of said second contact elements (43) of said contact means has a bent portion (43b) which projects from said recess of said card receiving portion and can be smoothly brought into engagement with a corresponding one of said engagement recesses of said IC card.

17. A connection mechanism according to any of claims 10 to 13, wherein said contact means includes:

A recess (51) formed in said side wall of said card receiving portion and stop portions (51a) formed at opposite sides of its opening;

a contact element in the form of a hook (54) made of an electroconductive material and having at its one end a contact point (54a), the other end of each contact element being fixed inside said recess of said card receiving portion and electrically connected to a control section of said external device;

a contact pin (53) having an engagement head (53a) capable of engaging with said engagement recess (21) of said IC card, and a contact member (53b) capable of contacting or separating from said contact point of said contact element in response to the engagement or disengagement between said contact pin and said engagement recess of said IC card and also having a function of preventing said contact pin from coming out of said recess of said card receiving portion by engaging with said stop portions formed at said opening of said recess; and

a spring (52) disposed inside said recess of said card receiving portion and adapted to provide a force constantly urging said contact pin to the outside of said recess of said card receiving portion, said spring being made of an electroconductive material, one end of each spring being electrically connected to said control section of said external device.

18. A connection mechanism according to claim 17, wherein said engagement head (53a) of said retaining pin is a semispheric-shape whereby said engagement pin can be smoothly brought into engagement with said engagement recess of said IC card.

19. A connection mechanism for connecting an IC card and an external device to each other, substantially as herein described with reference to Figures 4 to 6, Figures 7 and 8, Figures 9 to 12, or figures 13 to 15 of the accompanying drawings.

FIG. 1
PRIOR ART

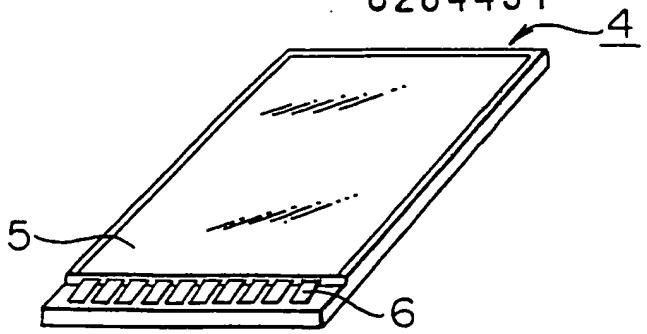


FIG. 2
PRIOR ART

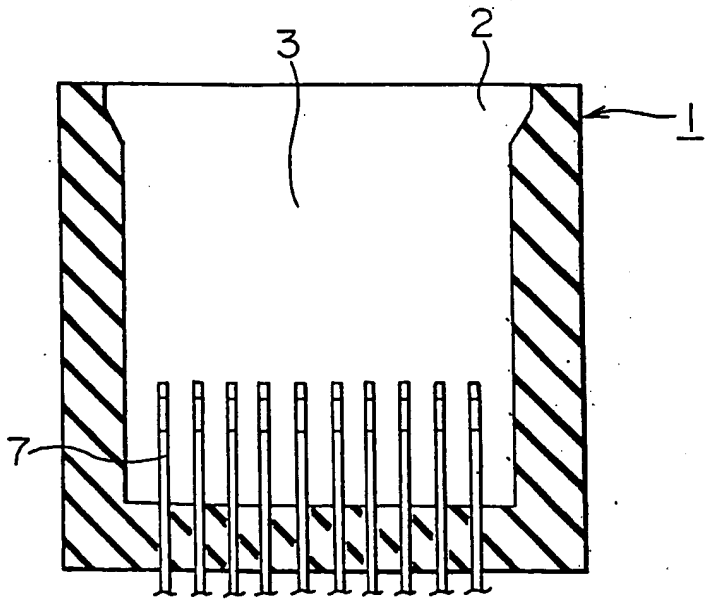


FIG. 3
PRIOR ART

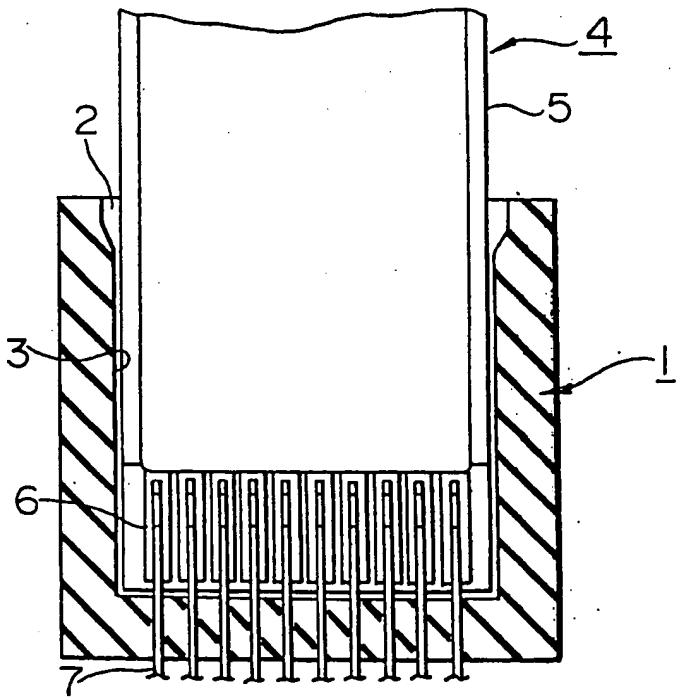


FIG. 4

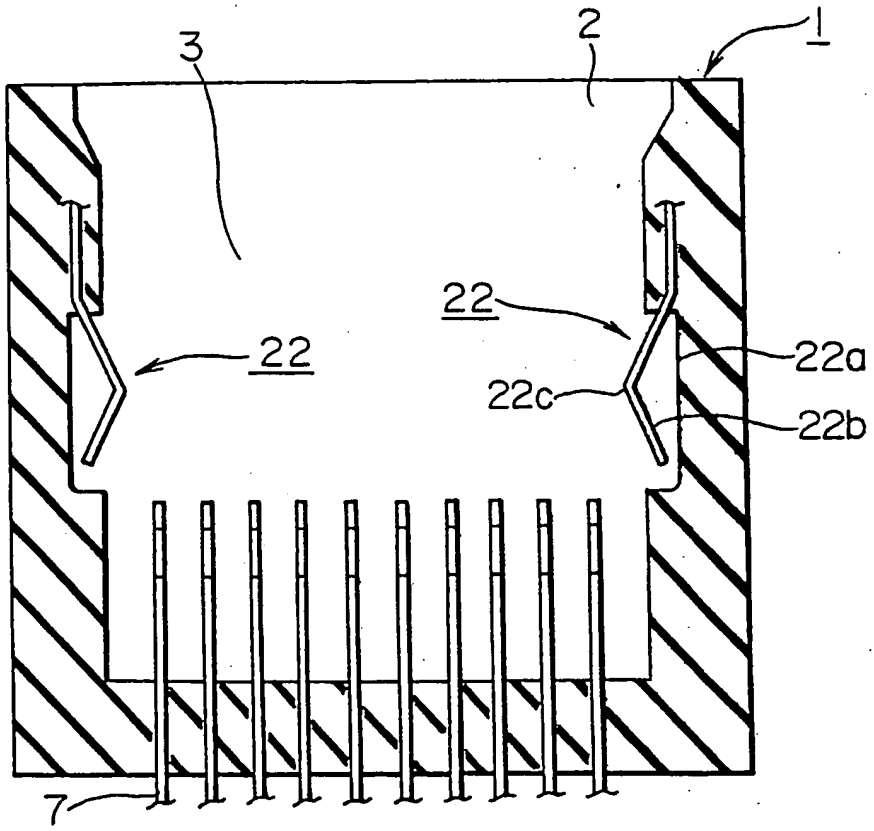


FIG. 5

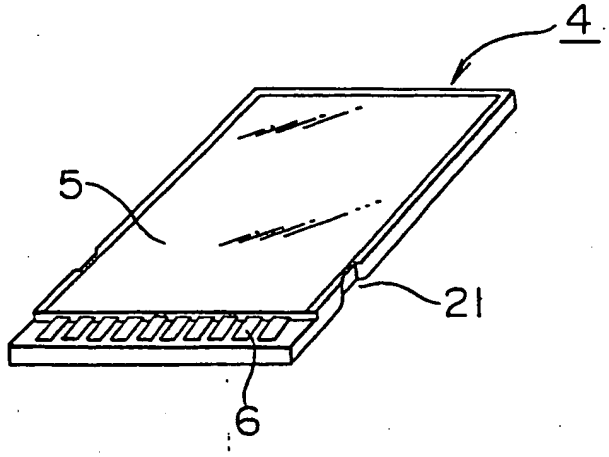


FIG. 6

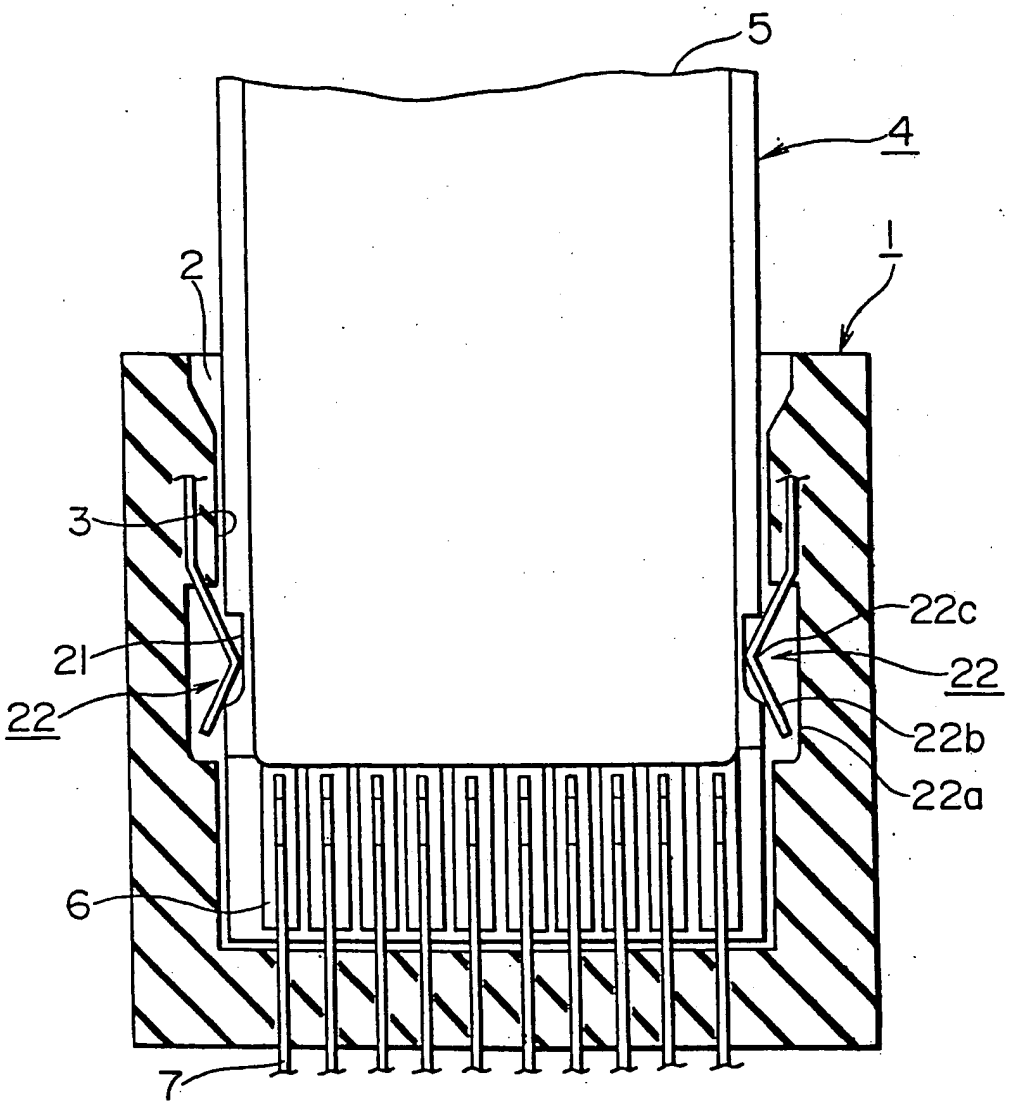


FIG. 7

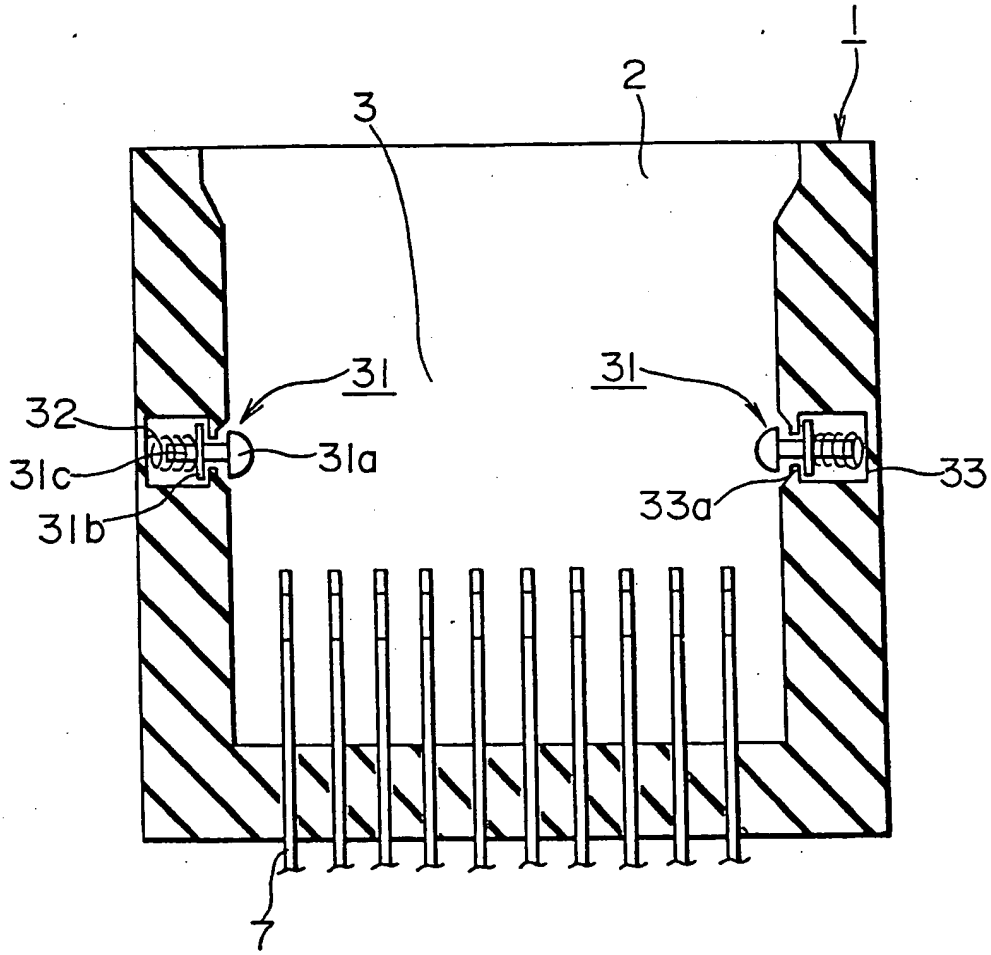


FIG. 8

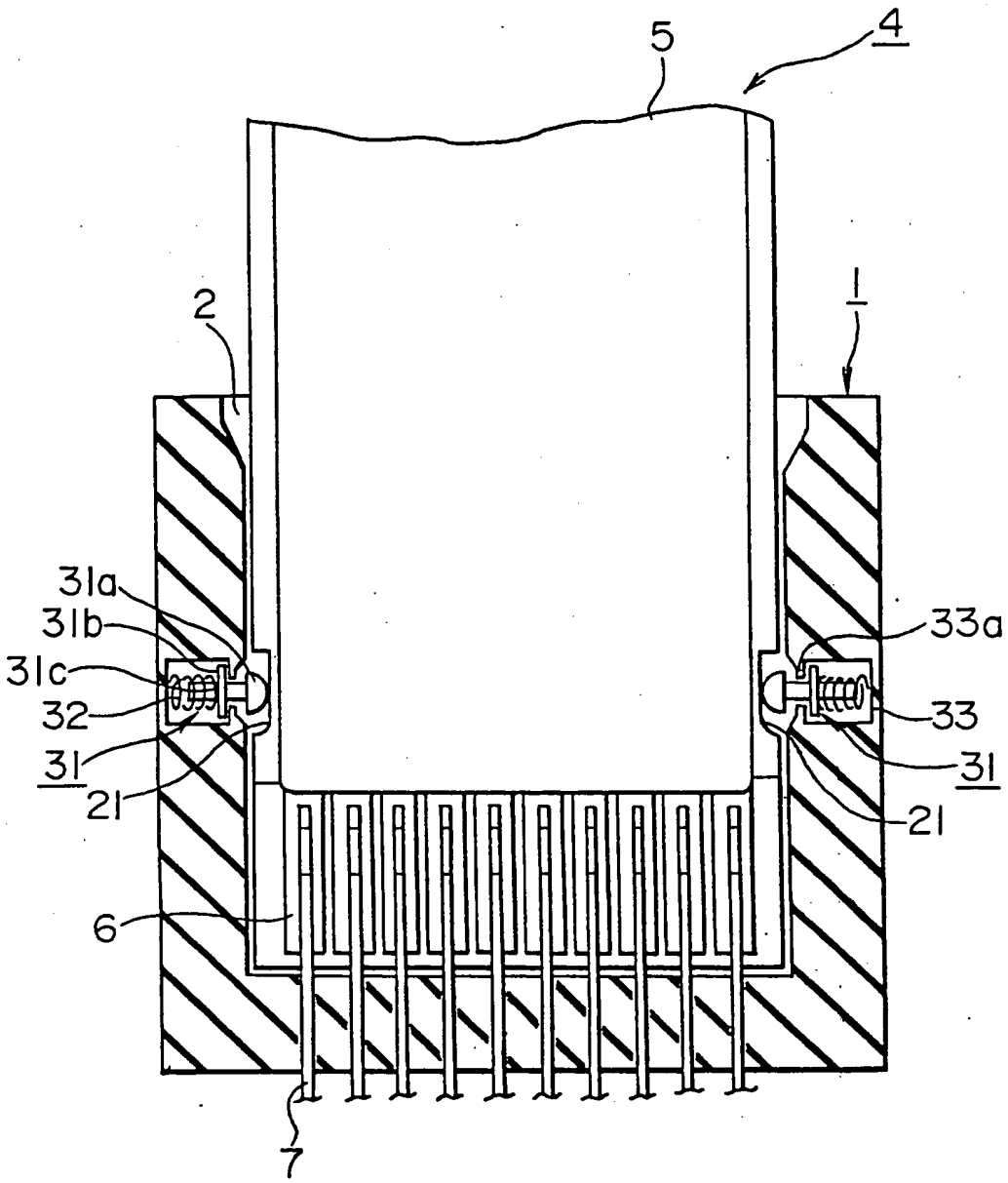


FIG. 9

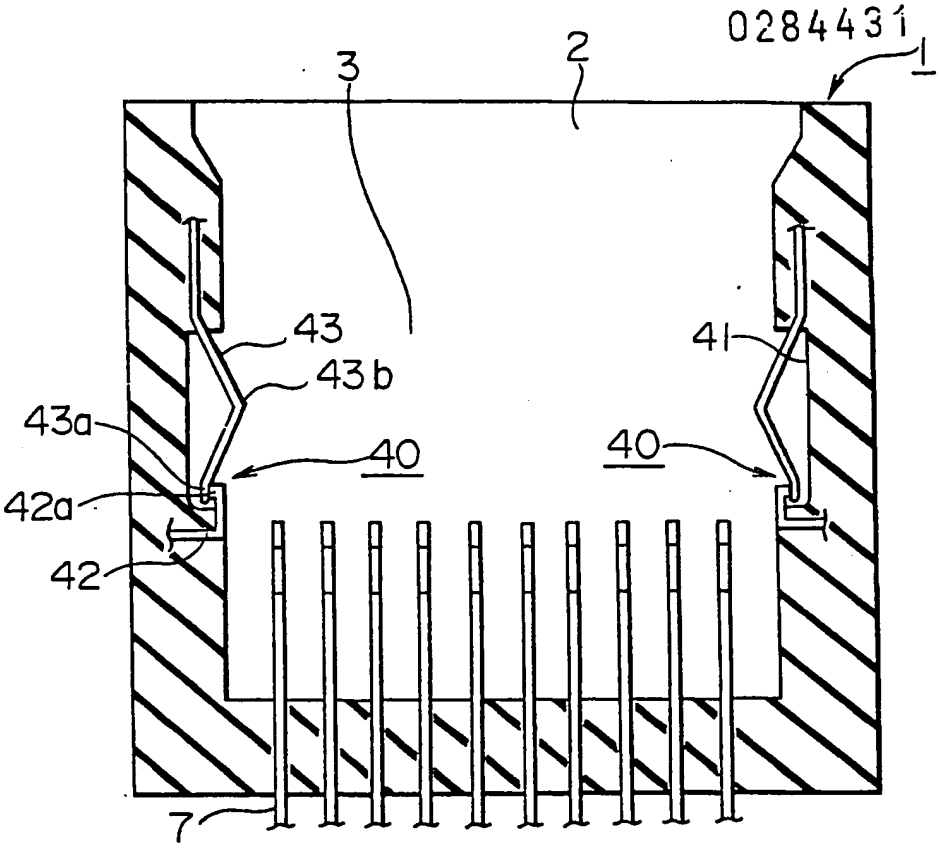


FIG. 10

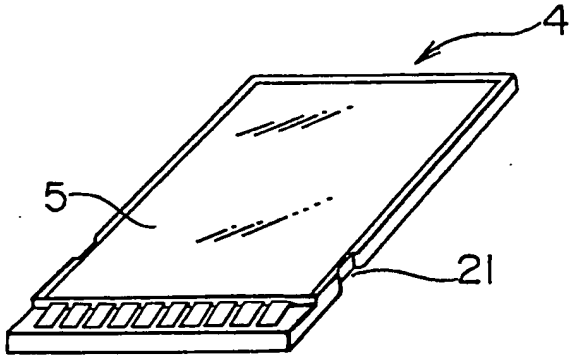


FIG. 11

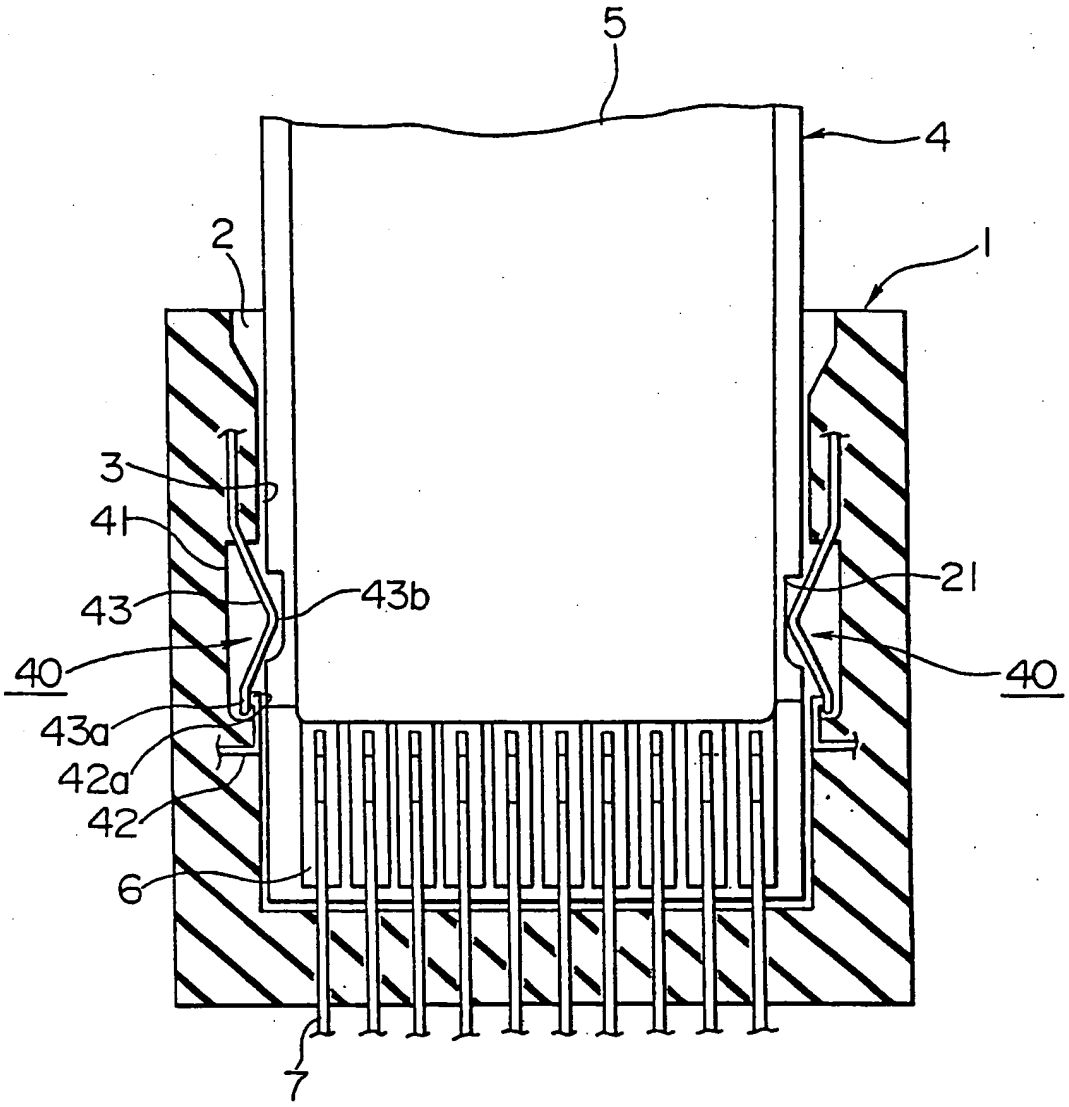


FIG. 12

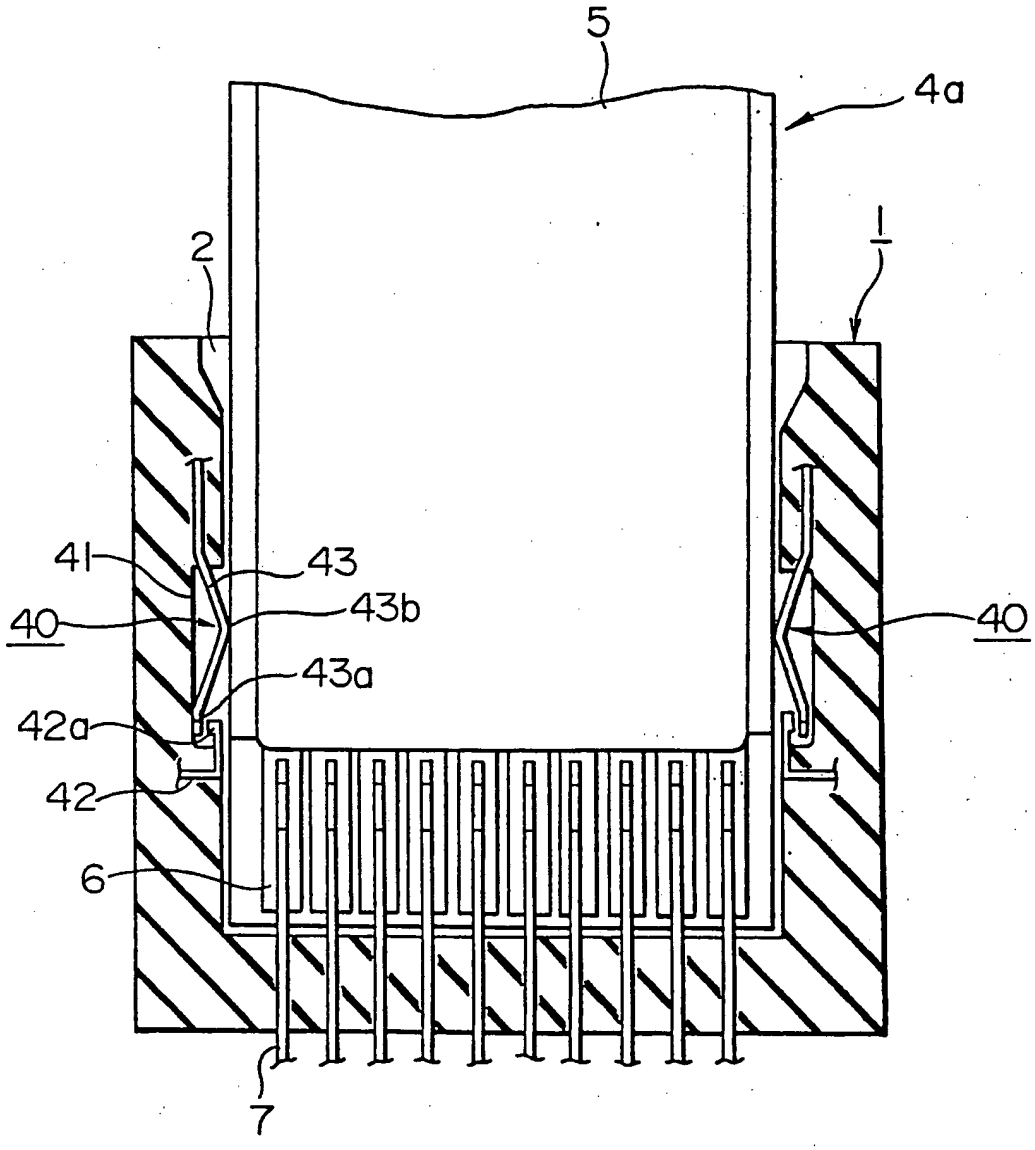


FIG. 13

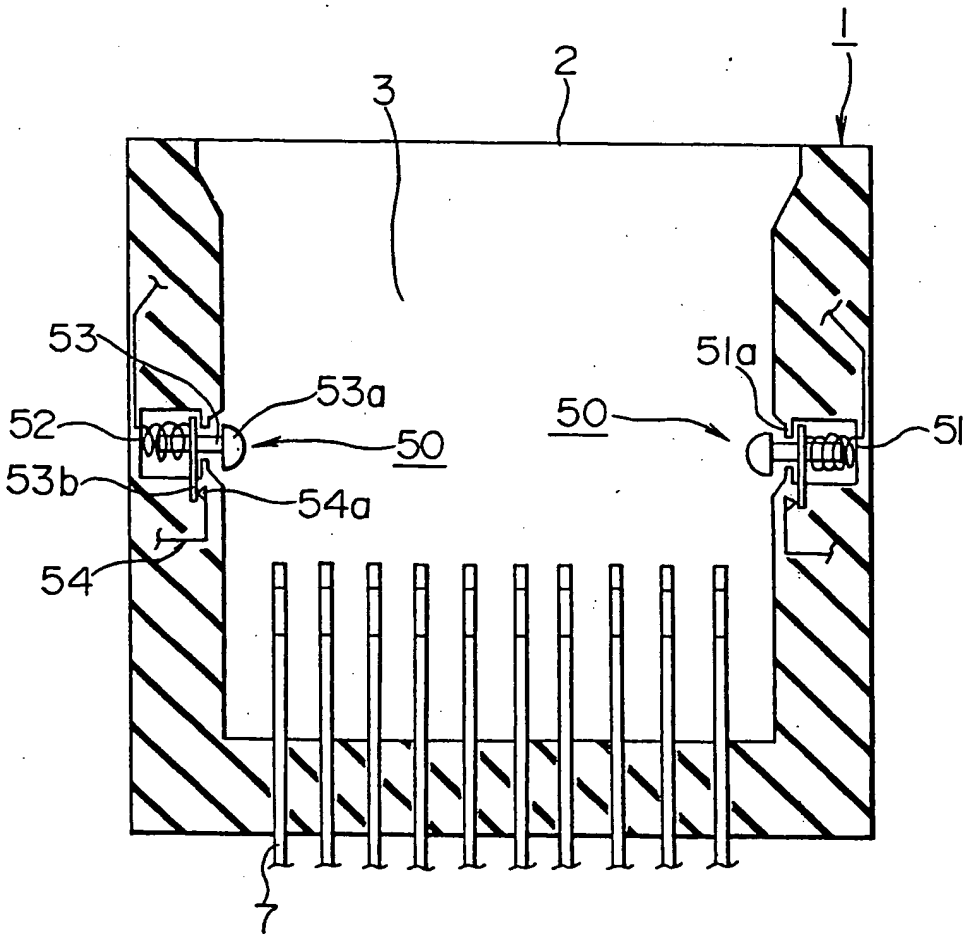


FIG. 14

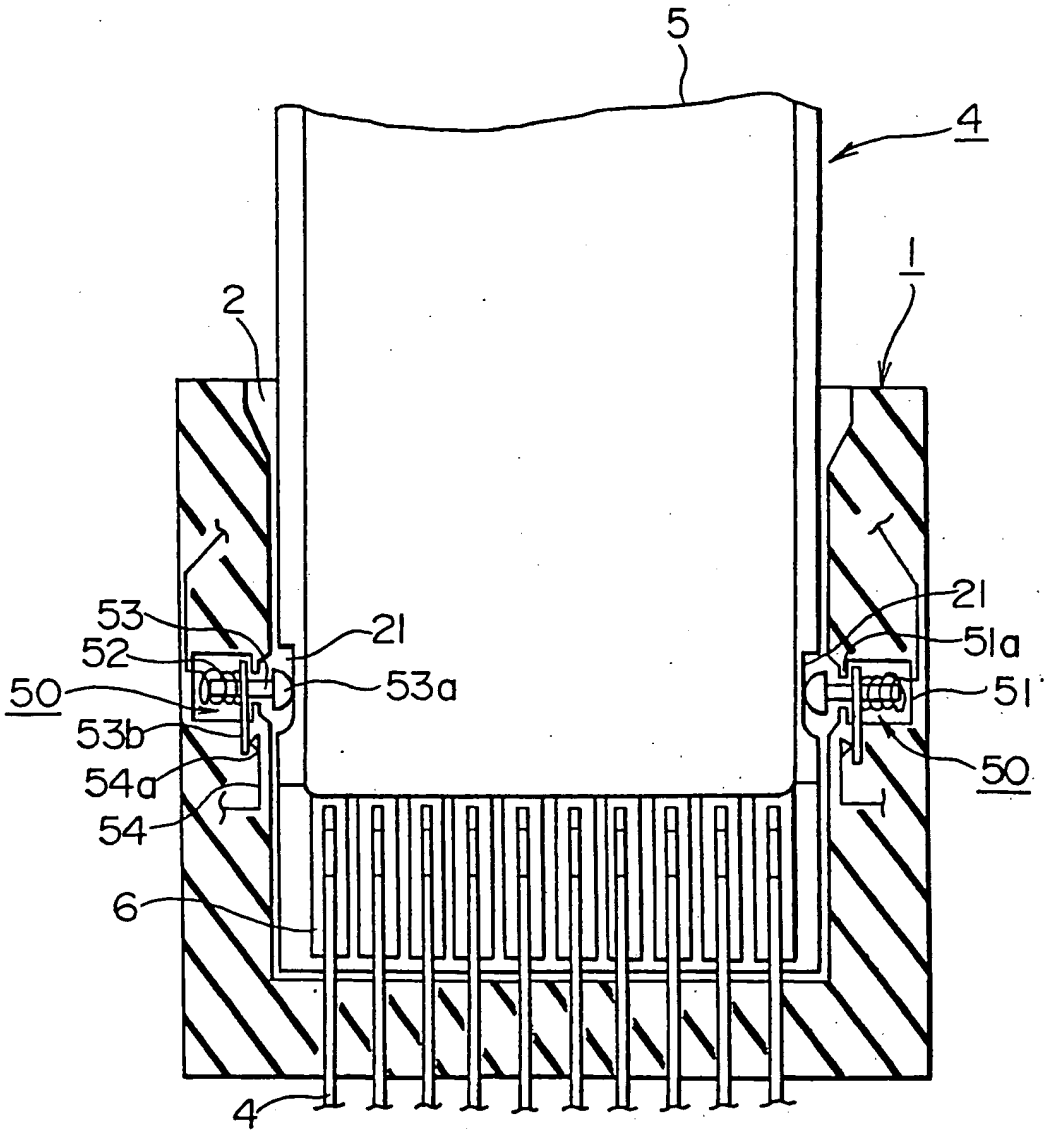
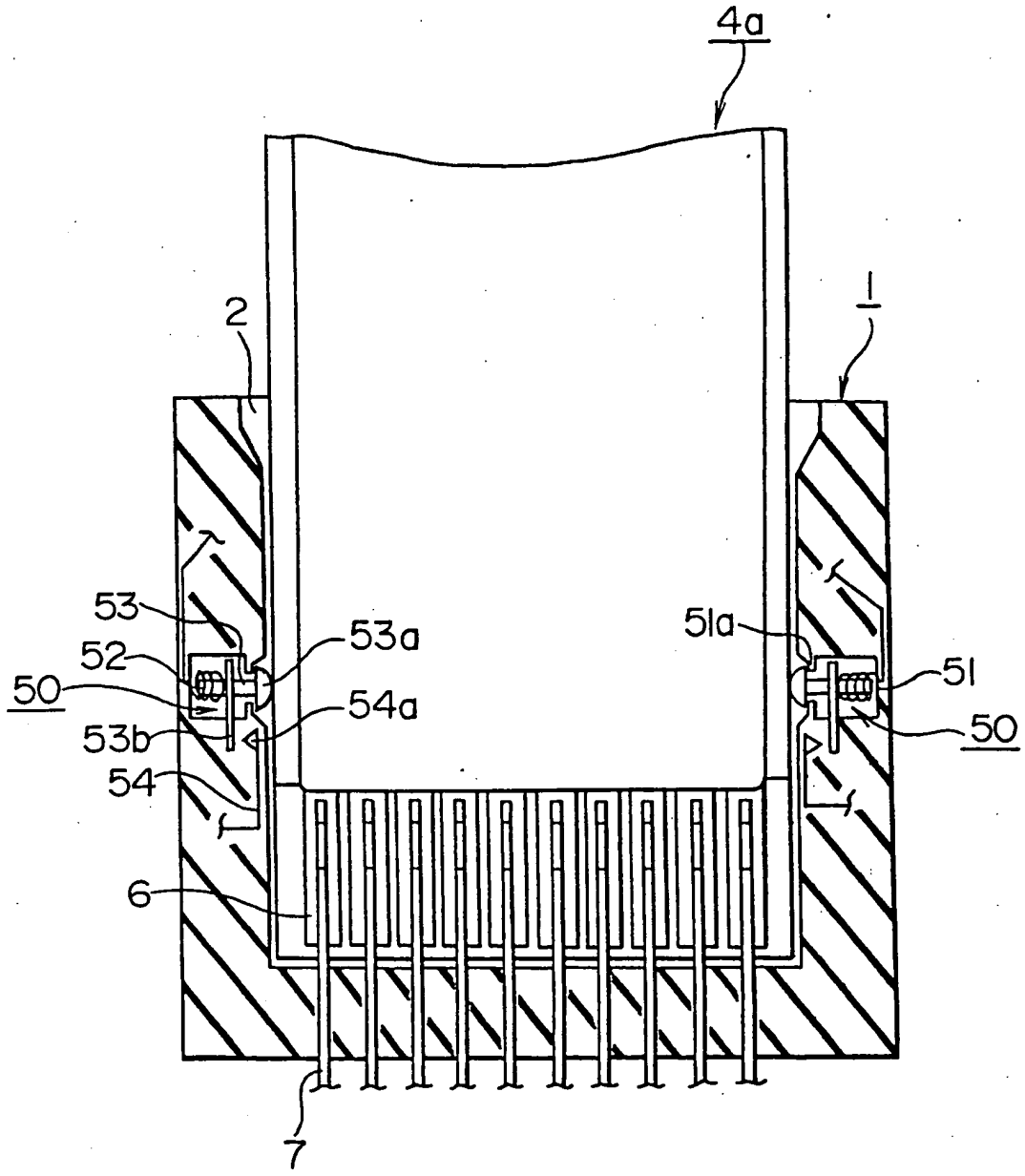


FIG. 15



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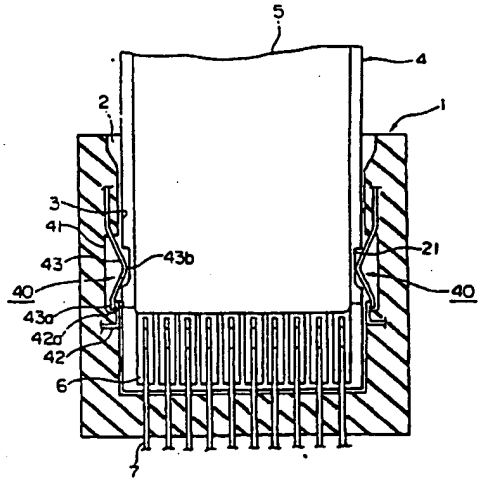
(54) Mechanism for connecting IC card and external device.

(57) A connection mechanism for connecting an IC card and an external device to each other has, a plurality of electrode terminals 6 formed on a package 5 of the IC card in which a semiconductor device is incorporated, to connect the semiconductor device to the external device; a pair of engagement recesses formed on the package of the IC card; and a connector provided in the external device, having a card receiving portion 3 into which the IC card is inserted, a plurality of electrode contacts 7 inside the card receiving portion for contacting the electrode terminals of the IC card when the IC card is inserted into the card receiving portion to a predetermined position. A pair of resilient retaining members 43 are disposed in the card receiving portion and are capable of advancing towards or retreating from engagement recesses 21 of the IC card and elastically engaging with the engagement recess so as to retain the IC card at the predetermined position when the IC card is inserted to the predetermined position. The retaining members may also act as switch contacts, to control the external device.

FIG. 11



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Application Number

EP 88 30 2704

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	DE-B-1 200 409 (DR. O. VIERLING) * figures 1,2; claim 1; column 1, lines 9-51 *	1-7,10, 19	H 01 R 23/70 H 01 R 13/71
A	EP-A-0 079 418 (PARISE & SONS INC.) * figures 4a-4c; page 9, line 30 - page 13, line 14 *	1,10,14 ,15,17-19	
A	US-A-3 343 852 (D.J. BLIGHT et al.) * figures 1,3,4; column 2, line 68 - column 3, line 24 *	8,9,17, 19	
A	DE-A-3 105 808 (STOCKO METALLWARENFABRIKEN HENKELS UND SOHN GMBH & CO.) * figures 1-4; page 4, line 8 - page 5, line 8 *	1-7,10, 19	
A	DE-A-2 909 616 (SIEMENS AG) * figure 1; page 5, lines 6-30 *	1-7,10, 19	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

H 01 R 23/00
H 01 R 13/00

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	02-05-1990	HAHN G

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